1. __________________________ all the genes present in a population

2. __________________________ the number of times an allele occurs in a gene pool compared with the number of times other alleles for the same gene occur

3. __________________________ traits controlled by two or more genes

4. __________________________ the success of an organism in surviving and reproducing

5. __________________________ humans select desirable traits that will be passed from one generation to another.

6. __________________________ individuals in the center of the phenotype curve have higher fitness than the others

7. __________________________ individuals at either end of the phenotype Curve have higher fitness than the others

8. __________________________ random changes in allele frequency

9. __________________________ Allele frequencies change because of the migration of a small population subgroup

10. __________________________ individuals better suited to the environment survive and reproduce most successfully

11. __________________________ preserved remains of ancient organisms

12. __________________________ A gene pool typically contains two or more for each gene.

13. __________________________ structures with different mature forms but develop from the same embryonic tissue.

14. __________________________ location where Darwin made most of his observations Leading to evolutionary theory
15. According to Graph A, what has occurred?

___________________________________

16. According to Graph B, what has occurred?

___________________________________

17. According to Graph C, what has occurred?

___________________________________

18. Which of the three graphs in the figure might show a population of birds that specialize in different food types? Explain your answer. (How do you know?)

19. What factor or condition might have led to the change shown in Graph A?

20. There is a brief period when frog mating nearly stops. When does this occur?

21. What mechanism appears to keep bullfrogs reproductively isolated?

22. Which two frog species would be most likely to interbreed?
23. ________ An adaptation is an inherited characteristic that can be
   a. Physical or behavioral  c. acquired during the organism’s lifetime
   b. Physical or geographical d. the result of artificial selection

24. ________ On the Galapagos Islands, Charles Darwin observed
   a. Completely unrelated species on each of the islands.
   b. Species exactly like those found in South America
   c. Somewhat similar species with traits that suited their particular environment
   d. Species completely unrelated to those found in South America

25. ________ In humans, the pelvis and the femur, or thighbone, are involved in walking.
In whales, the pelvis and femur are
   a. Examples of fossils  c. acquired traits
   b. Vestigial structures d. examples of natural variation

26. ________ Lamarck’s theory of evolution includes the concept that new organs in a
   species appear as a result of
   a. Continual increases in population size
   b. The actions of organisms as they use or fail to use body structures
   c. An unchanging local environment
   d. The natural variations already present within the population of organisms.

27. ________ The economist Thomas Malthus suggested that
   a. People die faster than babies are born
   b. There would soon be insufficient food for the growing human population
   c. In the 1700s, England needed more housing
   d. The majority of a species’ offspring die

28. ________ Darwin’s theory of evolution suggests that
   a. Species change over time
   b. Extinct species are not related to living species
   c. Different species can interbreed
   d. Animals that look alike are the most closely related.

29. ________ The species of tortoises that Darwin found on the Galapagos Islands
   displayed different structural adaptations. One of the adaptations that Darwin noted
   was the
   a. Similarity in the tortoises’ embryos
   b. Difference in shell markings of the tortoises
   c. Variation in length of the tortoises’ necks
   d. Difference in the number of eggs in each tortoise’s nest
30. The hypothesis that species change over time by natural selection was proposed by
   a. Hutton  c. Malthus
   b. Lamarck  d. Darwin

31. In the 1800s, Charles Lyell emphasized that
   a. The human population would outgrow the available food supply
   b. All populations evolve through natural selection
   c. Earth is a few thousand years old
   d. Past geological events must be explained in terms of processes observable today.

32. When a farmer breeds only his or her best livestock, the process involved is
   a. Natural selection  c. artificial variation
   b. Artificial selection  d. survival of the fittest

33. Which statement describes what all members of a population share?
   a. They are temporally isolated from one another
   b. They are geographically isolated from one another
   c. They are members of the same species
   d. They have identical genes

34. Which statement about gene pools is typically true?
   a. They contain two or more alleles for each gene
   b. They contain only dominant alleles
   c. They belong to two or more interbreeding species
   d. The relative frequencies of the alleles never change

35. If an allele makes up one fourth of a population’s alleles for a given trait, its relative frequency is
   a. 100 percent  c. 25 percent
   b. 75 percent  d. 4 percent

36. In many kinds of organisms, most heritable differences are due to
   a. mutations during gamete formation
   b. chemicals in the environment
   c. gene shuffling during gamete formation
   d. the effects of radiation
37. Gene shuffling includes the independent movement of chromosomes during meiosis as well as
   a. mutations from radiation
   b. changes in the frequencies of alleles
   c. crossing over
   d. changes in the frequencies of alleles

38. A single-gene trait that has two alleles and that shows a simple dominant-recessive pattern will result in
   a. one phenotype
   b. two phenotypes
   c. four phenotypes
   d. millions of phenotypes

39. When individuals with an average form of a trait have the highest fitness, the result is
   a. not predictable
   b. disruptive selection
   c. directional selection
   d. stabilizing selection

40. Genetic drift tends to occur in populations that
   a. are very large
   b. are small
   c. are formed from new species
   d. have unchanging allele frequencies

41. The type of genetic drift that follows the colonization of a new habitat by a small group of individuals is called
   a. the Hardy-Weinburg principle
   b. the founder effect
   c. directional selection
   d. stabilizing selection

42. The genetic equilibrium of a population can be disturbed by each of the following EXCEPT
   a. nonrandom mating
   b. immigration and emigration
   c. a large population size
   d. mutations

43. Allele frequencies of a population are more likely to remain unchanged if
   a. the population size is reduced
   b. frequent movement into and out of the population occurs
   c. all mating is random
   d. the mutation rate increases

44. What situation might develop in a population having some plants whose flowers open at midday and other plants whose flowers open late in the day?
   a. Behavioral isolation
   b. Geographic isolation
   c. temporal isolation
   d. genetic drift
45. ________ The Galapagos finch species are an excellent example of
   a. Speciation          c. stabilizing selection
   b. Genetic equilibrium  d. selection on single-gene traits

46. ________ The combined genetic information of all members of a population is the
   a. Relative frequency          c. genotype
   b. Phenotype                  d. gene pool

47. ________ A change in a sequence of DNA is called a
   a. Recombination          c. single-gene trait
   b. Polygenic trait        d. mutation

48. ________ The two main sources of genetic variation are
   a. Genotypes and phenotypes    c. Single-gene traits and polygenic traits
   b. Gene shuffling and mutations d. directional selection and disruptive selection

49. ________ The number of phenotypes produced for a given trait depends upon
   a. The number of genes that control the trait
   b. Which form of the trait is dominant
   c. The relative frequencies of the various alleles
   d. Whether or not natural selection is at work

50. ________ Natural selection acts directly on
   a. Alleles          c. phenotypes
   b. Genes            d. mutations

51. ________ Which of the following events do biologists consider a random change?
   a. Directional selection          c. disruptive selection
   b. Speciation                    d. genetic drift

52. ________ Situation in which allele frequencies of a population remain constant
   a. Evolution          c. genetic equilibrium
   b. Genetic drift      d. natural selection

53. ________ A factor that is necessary for the formation of a new species is
   a. Reproduction at different times    c. geographic barriers
   b. Different mating behaviors        d. reproductive isolation

54. ________ The hypothesis that the earth is very old was introduced by
   a. Hutton                  c. Malthus
   b. Lamarck                  d. Lyell
55. What was the scientific value of the specimens that Darwin brought back to England?

56. Suppose that selective breeding has produced a population of very similar chickens. Would that population survive if it were released into the world? Explain.

57. Are the members of a population necessarily the same species? Explain.

58. In genetic terms, what indicates that evolution is occurring in a population?
59. What five conditions are required to maintain genetic equilibrium?

60. Describe the steps of speciation Darwin envisioned occurring in the Galapagos islands.

61. Would a trait that has only two distinct phenotypes more likely to be a single-gene trait or a polygenic trait? How do you know?

62. Is an allele for a trait that has no effect on a species’ fitness affected by natural selection? Explain?
Biology Ch 15 & 16 Practice Test Answer Key

1. Gene pool
2. Relative frequency
3. Polygenic Trait
4. Fitness
5. Artificial Selection
6. Stabilizing Selection
7. Disruptive Selection
8. Genetic Drift
9. Founder Effect
10. Natural Selection
11. Fossil
12. Alleles
13. Homologous Structures
14. Galapagos Islands
15. Directional Selection
   (There are now no birds with very small beaks and some birds with very large beaks have evolved. The average beak size of the birds represented in graph A has increased through directional selection)
16. Stabilizing Selection
   (There are more birds with a body mass of average size. Stabilizing selection has occurred.)
17. Disruptive Selection
   (There are more birds with smaller or larger beak sizes and no birds having the average beak size. Disruptive Selection has occurred.)
18. Graph C shows a population with two very different beak sizes, which indicates that the birds could be eating different foods. (Answers might vary and still be okay) A change in the bird’s environment could have caused the directional selection. This could be something like the introduction of larger food.
19. Mating nearly stops in early to mid-May
20. Temporal Isolation. There might also be behavioral isolation in the early part of June.
21. The Leopard Frog and Peeper frog are not temporally isolated and, if there were no other factors causing reproductive isolation, they could breed.
22. A. physical or behavioral
23. C. Somewhat similar species with traits that suited their particular environment
24. B. Vestigial structures
25. B. The actions of organisms as they use or fail to use body structures
26. B. There would soon be insufficient food for the growing human population
27. A. Species change over time
28. C. Variation in length of the tortoises’ necks
29. D. Darwin
30. A. The human population would outgrow the available food supply
32. B. artificial selection
33. C. They are members of the same species
34. A. They contain two or more alleles for each gene
35. C. 25 percent
36. C. gene shuffling during gamete formation
37. C. crossing over
38. B. two phenotypes
39. D. stabilizing selection
40. B. are small
41. B. the founder effect
42. C. a large population size
43. C. all mating is random
44. A. behavioral isolation
45. A. Speciation
46. D. gene pool
47. D. mutation
48. B. gene shuffling and mutations
49. A. the number of genes that control the trait
50. C. phenotypes
51. D. genetic drift
52. C. genetic equilibrium
53. D. reproductive isolation
54. D. Lyell
55. Darwin collected many examples of similar, but not identical, modern organisms and fossils that were previously unknown
56. The population’s survival would depend on how well adapted its members were to the new environment. If they were not well adapted to that particular environment, the population would probably not survive because there would be so little variation.
57. Yes, the term population is defined as a collection of individuals of the same species in the same area
58. There is a change in the relative frequency of alleles in a population.
59. Random mating
   - Large population
   - No immigration or emigration
   - No mutations
   - No natural selection
60. (1) Founders arrive (the first finches flew to an island)  
   (2) Separation of Populations (the same birds flew to a different island.  
   (3) Changes in the Gene Pool (birds adapted to their local environment)  
   (4) Reproductive Isolation (birds on each island can no longer reproduce with each other)  
   (5) Ecological Competition (birds on the first island compete with each other and become specialized for a niche)  
   (6) Evolution Continues (the process repeats itself)  

61. No, An allele for a trait having no effect on fitness will not be affected by natural selection because it does not affect survival or reproduction.